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NOTES ON GEOGRAPHIC DISTRIBUTION

Crossodactylus schmidti Gallardo, 1961 (Anura: Hylodidae) in Santa Catarina state, southern Brazil: A new record and comments on its conservation status

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ABSTRACT: We present a new record of *Crossodactylus schmidti* Gallardo, 1961 and the first record of this species in a conservation unit in Santa Catarina state. We also provide information on the habitat use and the conservation status of the species in the state.

Crossodactylus schmidti Gallardo, 1961 occurs in Misiones, Argentina, southeastern Paraguay, and in the states of Paraná (Caldart *et al.* 2010; Frost 2011), Rio Grande do Sul (Caldart *et al.* 2010) and Santa Catarina (Lucas and Garcia 2011), Brazil. The data reported by Caldart *et al.* (2010) for Paraná state should be considered with caution, since they were based only on Museum records, without examination of the material (V.M. Caldart com. pers.) Despite the relatively broad geographic distribution, the occurrence of *C. schmidti* is very fragmented and associated with the southern region of the Atlantic Forest. In Brazil, these areas are among the most endangered due to deforestation and replacement homogeneous plantings of exotic pine and eucalyptus (Câmara 2005). The sites of occurrence of *C. schmidti* are typically creeks with rocky bottoms in forest, at elevations between 300 and 750 m (Frost 2011). In Santa Catarina state, the recent record reported by Lucas and Garcia (2011) was the first after the collection of specimens by the naturalist Fritz Plaumann in 1951.

We observed *C. schmidti* at the Parque Estadual Fritz Plaumann (PEFP), a conservation unit located in the municipality of Concórdia, western Santa Catarina, southern Brazil (27°17'36" S, 52°06'38" W; 400 m elevation; Figure 1). PEFP is located approximately 40 km E of the site of the record reported by Fritz Plaumann in Nova Teutônia, municipality of Seara and approximately 210 km E of the location reported by Lucas and Garcia (2011). The conservation unit is a 741 ha fragment of Seasonal Forest near the Uruguai River, where invasive species such as *Hovenia dulcis* (Japanese raisin tree) and *Hedichyum coronarium* (white garland lily) are frequently observed. The identification of *C. schmidti* was based on the description by Gallardo (1961). Specimens were collected by hand, weighed using a dynamometer Pesola® (0.1 g) and measured using calipers Mitutoyo® (0.01 mm). Microhabitat information was recorded. Most specimens were released, but some were collected as vouchers, under permit number 004/2010 issued by FATMA (Fundação do Meio Ambiente de Santa Catarina). Vouchers were deposited in the collection of amphibians of the Universidade Comunitária da Região de Chapecó (Specimen Numbers CAUC 0888-0892).

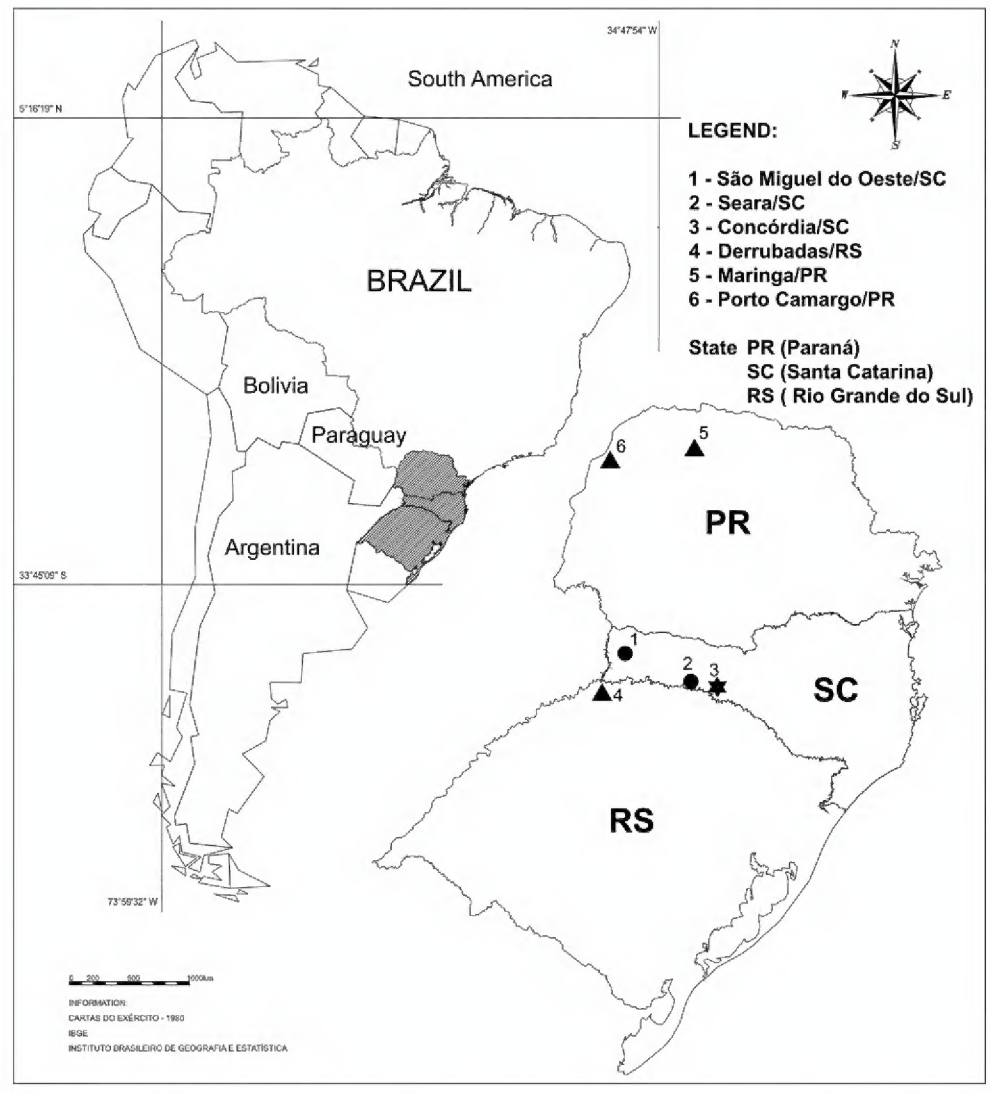

FIGURE 1. Geographic distribution of *Crossodactylus schmidti* in the southern Brazil. The star indicates the present record and the circles the localities cited by Lucas and Garcia (2011), in the state of Santa Catarina. Triangles indicate records for the states of Rio Grande do Sul and Paraná cited by Caldart *et al.* (2010).

The observations were carried out once a month from August 2010 to June 2011, from sunset to approximately 23:00 h. We observed 55 adults and 29 juveniles during this period. For males, the mean snout-vent length (SVL) was 28 ± 2.9 mm (n = 7; range = 23.7 – 31.3 mm) and body

mass was 2.5 ± 0.9 g (n = 7; range = 1.2 – 3.7 g), while for females, mean SVL was 32.6 ± 2.9 mm (n = 10; range = 28.8 – 37.6 mm) and body mass was 4.1 ± 1 g (n = 10; range = 2.5 – 6 g). Females were significantly larger and heavier than males (U_{SVL} = 10; p = 0.02; n = 16; U_{Mass} = 8.5; p<0.01; n = 16). Juveniles were defined as having SVL<20 mm. Records of individuals were considered independent, as we did not mark the recorded specimens.

All individuals of *Crossodactylus schmidti* were found in a creek on a forested slope with small waterfalls. The bottom of the creek was rocky, with clear water. Most individuals were found under rocks (n = 42; 50%) partially under flowing water or completely exposed on rocks above the water (n = 21; 25%). Occasionally we observed *C. schmidti* on marginal vegetation (n = 9; 10.7%), moist soil (n = 7; 8.3%), dry soil (n = 3; 3.5%), wet soil (n = 1; 1.1%) and logs (n = 1; 1.1%). In the water, individuals preferred shallow locations, less than 5 cm deep (n = 27; 71%) at a distance from the shore between 0 to 300 cm ($\bar{x}$ = 77 ± 70 cm; n = 27). We did not observe frogs calling, but tadpoles were present, indicating that adults were active.

Little but relatively recent information is available on the natural history and ecology of species of the genus *Crossodactylus* (*e.g.* Almeida-Gomes *et al.* 2007a, b; Pimenta *et al.* 2008; Wachlevski *et al.* 2008). For *C. schmidti*, the few studies available (*e.g.* Gallardo 1961; Caldart *et al.* 2010; Lucas and Garcia 2011) have reported the same pattern of habitat use, suggesting that *C. schmidti* is a habitat specialist, and probably very sensitive to human-induced changes. Although species of the genus *Crossodactylus* are predominantly diurnal (Almeida-Gomes *et al.* 2007a), we observed all *C. schmidti* active at night in the study site and calling activity during day in other sites.

In Santa Catarina state, the occurrence of *C. schmidti* is associated with formations of Mixed Ombrophile Forest and Seasonal Forest. These formations, located in the western portion of the state, are represented by a few small natural remnants (Ribeiro *et al.* 2009) that have been highly impacted due to human activities such as crops, poultry and pig farming, and more recently, hydroelectric power plants. These activities compromise the quality of water bodies by contamination with wastewater and pesticides (Arias *et al.* 2007), and the conversion of lotic to lentic habitats (Agostinho *et al.* 2005). In addition, because changes have been proposed to amend the Brazilian Forest Code (Toledo *et al.* 2010), remnants of riparian areas might be reduced even further. This scenario, combined with the presence of *C. schmidti* in only two small widely separated creeks (approximately 210 km apart) and with conservation problems (Lucas and Garcia 2011; this study), suggests that this species is potentially at risk of extirpation in Santa Catarina. Thus, further investigation is needed to evaluate the conservation status of the species at a national and global level. At the latter level, it is currently considered "near threatened" (IUCN 2011). Our findings indicate that although this species was not observed in several habitats where it would be usually expected in the western region of Santa Catarina (Lucas and Garcia 2011), further sampling efforts are necessary as well as population studies.

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